Tiered Evaluations for Dredged Material

James River Partnership Meeting

December 03, 2003

by

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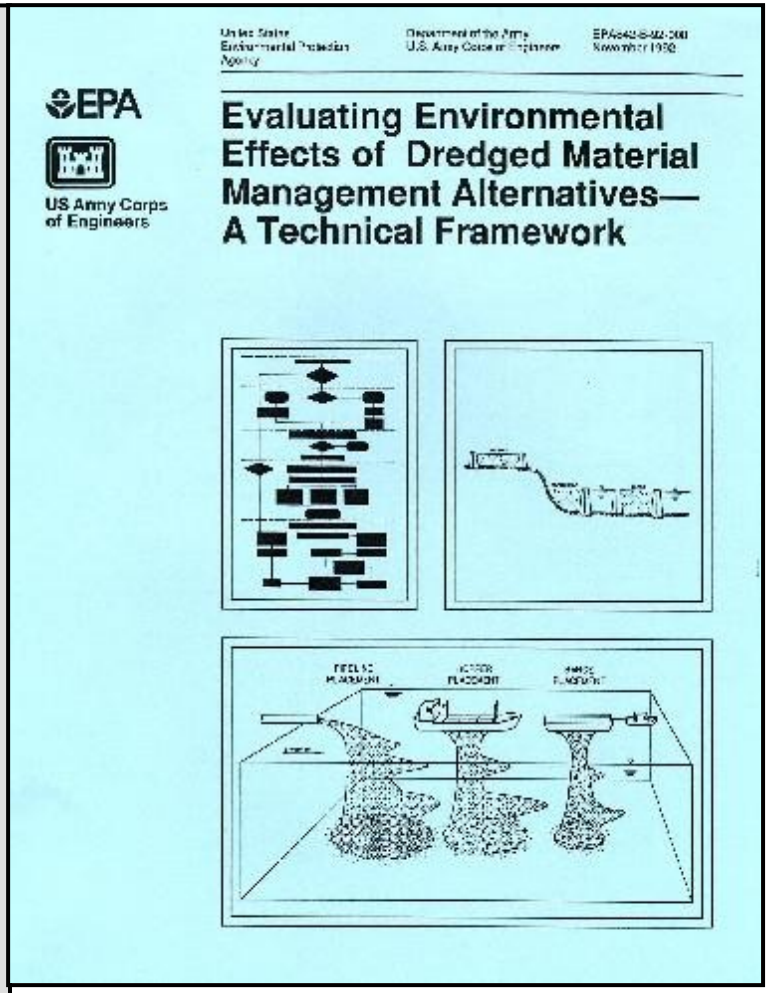
Regulatory Considerations

- Dredged material is regulated as a CWA Section 404 discharge to waters of the US
- State Issues a Section 401 Water Quality Certification
- NEPA requires consideration for all pathways of concern

USACE/ EPA

Technical Framework

- Jointly Developed
- Alternative Selection
- Environmental Suitability
- Open Water
- Confined (diked)
- Beneficial Uses
- Full range of materials
- Umbrella for OTM, ITM,

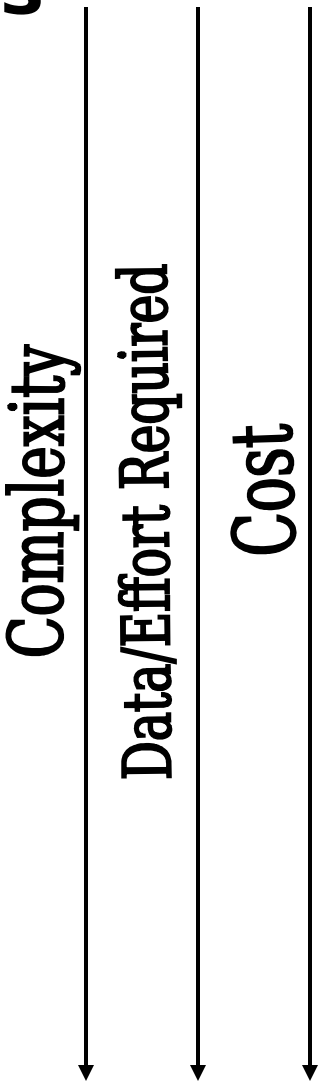

EPA
US Army Corps of Engineers
Evaluating Environmental Effects of Dredged Material Management Alternatives—A Technical Framework

OTM/ ITM/ UTM – What do they do?

- Ocean Testing Manual/ Inland Testing Manual
  - Evaluate potential Open Water contaminant effects
  - Determine suitability of material for open water placement
- Upland Testing Manual
  - Evaluates potential contaminant effects of material placement in a CDF
  - Determines the need for management actions or controls for placement of material in a CDF

A Tiered Approach for Evaluations

Tier I	**Existing Info**
Tier II	**Screening Evaluations**
Tier III	**Effects-Based Testing and Evaluations**
Tier IV	**Case Specific Studies/ Risk Assessment**



ERDC/EL TR-03-1
Environmental Laboratory
US Army Corps
of Engineers®
Engineer Research and
Development Center
Evaluation of Dredged Material Proposed for Disposal at Island, Nearshore, or Upland Confined Disposal Facilities — Testing Manual
U.S. Army Corps of Engineers
January 2003
Approved for public release; distribution is unlimited.

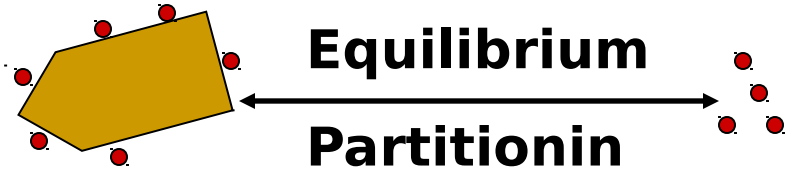
http://www.wes.army.mil/el/dots/pdfs/trel03-1.pdf

Initial Evaluations (Tier I)

- Need for Pathway Evaluations
  - "reason to believe"
  - sand/gravel; clean material; new work
- Identify Relevant Pathways
- Identify Contaminants of Concern
- Compile Existing Information

Evaluate all relevant pathways & Test only as needed!

Tier II - Screening



Equilibrium

Partitioning

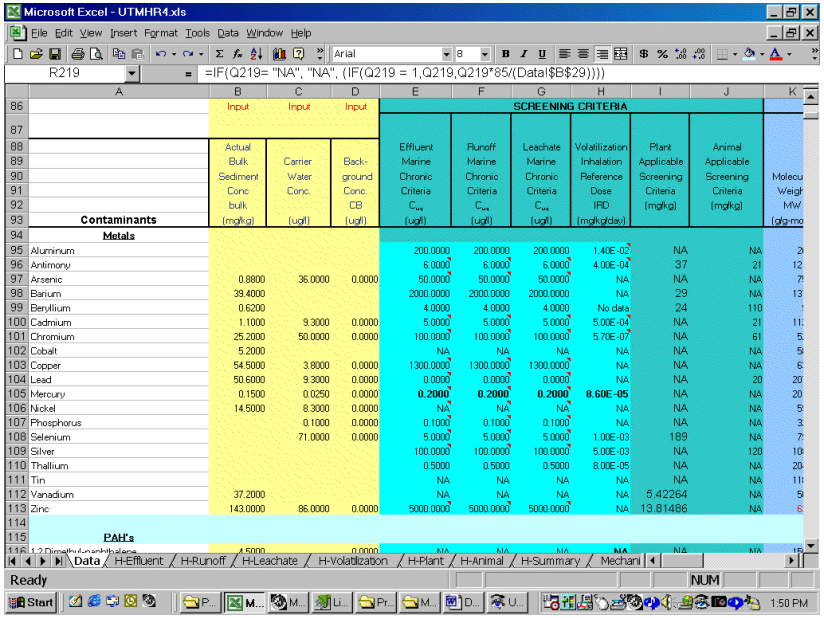
Effluent; Runoff; Leachate;

Volatiles (Henry's Law)

TBP + DPTA Extraction

Animal & Plant Uptake

Screening Spreadsheet



Microsoft Excel - UTMHR4.xls

File Edit View Insert Format Tools Data Window Help

R219 =IF(Q219= "NA", "NA", (IF(Q219 = 1,Q219,Q219*85/(Data!B29))))

	A	B	C	D	E	F	G	H	I	J	K
86		Input	Input	Input	SCREENING CRITERIA						
87											
88		Actual Bulk Sediment Conc bulk	Carrier Water Conc.	Back-ground Conc. CB	Effluent Marine Chronic Criteria C_{ss}	Runoff Marine Chronic Criteria C_{ss}	Leachate Marine Chronic Criteria C_{ss}	Volatilization Inhalation Reference Dose IRD	Plant Applicable Screening Criteria	Animal Applicable Screening Criteria	
89											
90											
91											
92											
93	**Contaminants**	(mg/kg)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(mg/kg/day)	(mg/kg)	(mg/kg)	(g/g-mo
94	**Metals**										
95	Aluminum				200.0000	200.0000	200.0000	1.40E-02	NA	NA	2
96	Antimony				6.0000	6.0000	6.0000	4.00E-04	37	21	12
97	Arsenic	0.8800	36.0000	0.0000	50.0000	50.0000	50.0000	NA	NA	NA	7
98	Barium	39.4000			2000.0000	2000.0000	2000.0000	NA	29	NA	13
99	Beryllium	0.6200			4.0000	4.0000	4.0000	No data	24	110	
100	Cadmium	1.1000	9.3000	0.0000	5.0000	5.0000	5.0000	5.00E-04	NA	21	11
101	Chromium	25.2000	50.0000	0.0000	100.0000	100.0000	100.0000	5.70E-07	NA	61	5
102	Cobalt	5.2000			NA	NA	NA	NA	NA	NA	5
103	Copper	54.5000	3.8000	0.0000	1300.0000	1300.0000	1300.0000	NA	NA	NA	6
104	Lead	50.6000	9.3000	0.0000	0.0000	0.0000	0.0000	NA	NA	20	20
105	Mercury	0.1500	0.0250	0.0000	**0.2000**	**0.2000**	**0.2000**	**8.60E-05**	NA	NA	20
106	Nickel	14.5000	8.3000	0.0000	NA	NA	NA	NA	NA	NA	5
107	Phosphorus		0.1000	0.0000	0.1000	0.1000	0.1000	NA	NA	NA	3
108	Selenium		71.0000	0.0000	5.0000	5.0000	5.0000	1.00E-03	189	NA	7
109	Silver				100.0000	100.0000	100.0000	5.00E-03	NA	120	10
110	Thallium				0.5000	0.5000	0.5000	8.00E-05	NA	NA	20
111	Tin				NA	NA	NA	NA	NA	NA	11
112	Vanadium	37.2000			NA	NA	NA	NA	5.42264	NA	5
113	Zinc	143.0000	86.0000	0.0000	5000.0000	5000.0000	5000.0000	NA	13.81486	NA	6
114											
115	**PAH's**										
116	1,2-Dimethylnaphalene	4.5000		0.0000	NA	NA	NA	NA	NA	NA	15

Data / H-Effluent / H-Runoff / H-Leachate / H-Volatilization / H-Plant / H-Animal / H-Summary / Mechani

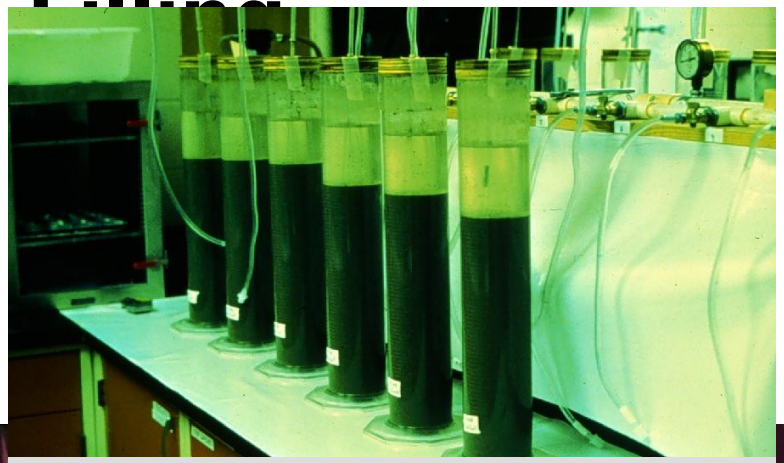
Ready NUM

Start 1:50 PM

Tier III

- Effects Based Testing and Evaluations
- Chemical and Biological Tests
- Models for Mixing, Attenuation, Dispersion
- Results of all Tier III tests can be used in Risk Assessments

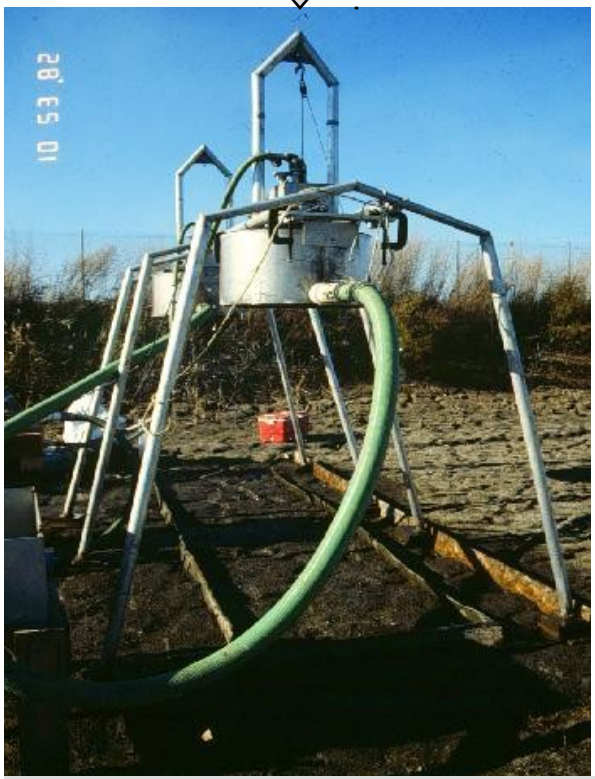
Effluent During Filling



Effluent Elutriate Test

Water Column Bioassay

Surface Runoff



Rainfall Simulator

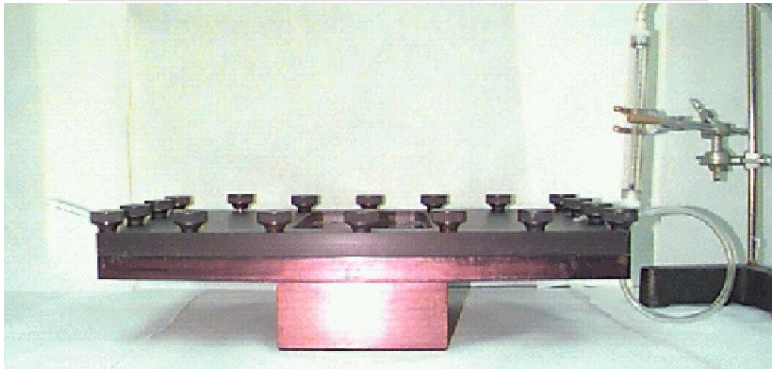
Leachate to Groundwater

Sequential Batch Leach Test (SBLT)

“Pancake” column leach test (PCLT)

Volatile Emissions to Air

Volatile Flux Chamber



Plant Uptake

Index Plant – Cyperus

Plant Bioassay

Animal Uptake

Earth Worm Bioassay

Guidance Documents

- DOTS Website
  - http://www.wes.army.mil/el/dots
- USACE/EPA Technical Framework
  - http://www.epa.gov/OWOW/oceans/framework/
- Upland Testing Manual
  - http://www.wes.army.mil/el/dots/pdfs/trel03-1.pdf

Take Home Message

- **Over 30 years and $150 Million in background and technical data bases**
- **Joint EPA and Corps developed protocols and evaluation guidelines**
- **OTM/ITM/UTM provide a tiered approach for evaluations**
- **Contaminant pathways must be appropriately evaluated**
- **Testing/ evaluation procedures are available for all pathways**
- **Evaluate all relevant pathways and test only as needed**

Questions?

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